

# Grade 9 EQAO Assessment of Mathematics

## Academic

### Student Preparation Booklet

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

School: \_\_\_\_\_

**Contents:** Key Words  
Strategies for Multiple Choice and Open Response Questions  
EQAO Formula Sheet  
Sample Questions from the 2009-10 Assessment  
Sample Questions from the Winter 2009 Assessment  
Sample Questions from the Spring 2009 Assessment  
Sample Questions from the Winter 2008 Assessment  
Sample Questions from the Spring 2008 Assessment



## **Grade 9 EQAO Assessment of Mathematics**

### **Key Words**

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

#### **Compare:**

Tell what is the same and what is different.

#### **Describe:**

Use words to create a mental picture for the reader.

#### **Determine:**

Use mathematics to find a solution to the problem.

#### **List:**

Use point form.

#### **Explain:**

Use words and symbols to make your solution clear.

#### **Justify:**

Give reasons and evidence to show your answer is correct.

#### **Show your work:**

Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

## Tools you should have access to:

- Pencil, ruler and eraser
- Scientific or Graphing calculator (You may not share with another student)
- Manipulatives (examples: algebra tiles, linking cubes, integer counters, 3D solids, 2D shapes ...)

## Strategies for Multiple Choice Questions:

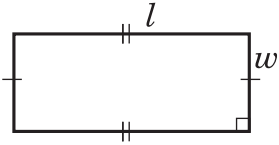
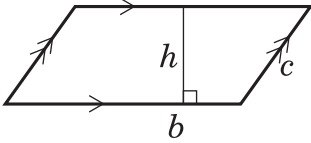
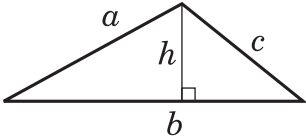
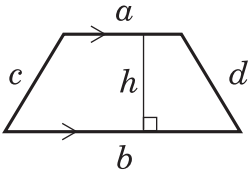
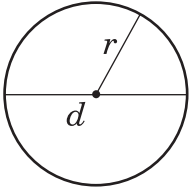
1. Cover the question choices and read the question stem carefully and highlight key words with a highlighter, especially the key words on the previous page.
2. Look at the choices and eliminate any of the responses that are not possible.
3. There is only **one** answer per question. Choose the best possible answer and shade your choice on the answer sheet.
4. Answer every question; there are no penalties for guessing.
5. Questions that have a graph are drawn to scale. Questions that have a diagram are usually not drawn to scale.

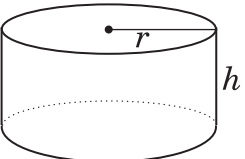
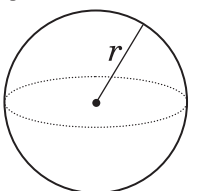
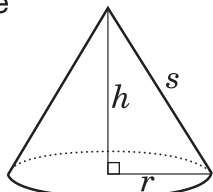
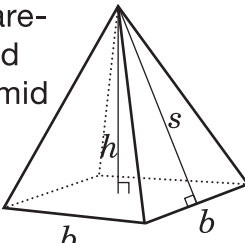
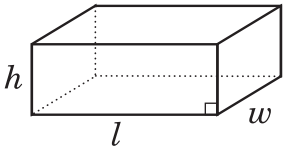
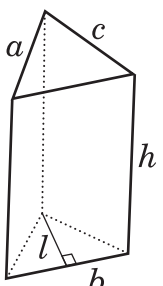
## Strategies for Open Response Questions:

1. These questions are designed to get you to think deeply about the mathematics you know. Complete solutions including any rough work are expected for these questions.
2. Read the question carefully and highlight any key words or information with a highlighter.
3. Write your solution in the space provided.
4. Don't erase any of your calculations, drawing or reasoning. Scorers want to see all your work.
5. Use the list of key words on the previous page to help you decide what is expected in your answer. For example, **explain** means to use words and symbols to make your solution clear and understandable.
6. The problems in these questions often have more than one way of being solved. Be sure to clearly explain your solution using pictures numbers and words.

# Formula Sheet

## Grade 9 Academic

Geometric Figure	Perimeter	Area
<p>Rectangle</p> 	$P = l + l + w + w$ or $P = 2(l + w)$	$A = lw$
<p>Parallelogram</p> 	$P = b + b + c + c$ or $P = 2(b + c)$	$A = bh$
<p>Triangle</p> 	$P = a + b + c$	$A = \frac{bh}{2}$ or $A = \frac{1}{2}bh$
<p>Trapezoid</p> 	$P = a + b + c + d$	$A = \frac{(a + b)h}{2}$ or $A = \frac{1}{2}(a + b)h$
<p>Circle</p> 	$C = \pi d$ or $C = 2\pi r$	$A = \pi r^2$

Geometric Figure	Surface Area	Volume
Cylinder 	$A_{\text{base}} = \pi r^2$ $A_{\text{lateral surface}} = 2\pi r h$ $A_{\text{total}} = 2A_{\text{base}} + A_{\text{lateral surface}}$ $= 2\pi r^2 + 2\pi r h$	$V = (A_{\text{base}})(\text{height})$ $V = \pi r^2 h$
Sphere 	$A = 4\pi r^2$	$V = \frac{4}{3} \pi r^3 \quad \text{or} \quad V = \frac{4\pi r^3}{3}$
Cone 	$A_{\text{lateral surface}} = \pi r s$ $A_{\text{base}} = \pi r^2$ $A_{\text{total}} = A_{\text{lateral surface}} + A_{\text{base}}$ $= \pi r s + \pi r^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3} \pi r^2 h \quad \text{or} \quad V = \frac{\pi r^2 h}{3}$
Square-based pyramid 	$A_{\text{triangle}} = \frac{1}{2} b s$ $A_{\text{base}} = b^2$ $A_{\text{total}} = 4A_{\text{triangle}} + A_{\text{base}}$ $= 2bs + b^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3} b^2 h \quad \text{or} \quad V = \frac{b^2 h}{3}$
Rectangular prism 	$A = 2(wh + lw + lh)$	$V = (\text{area of base})(\text{height})$ $V = lwh$
Triangular prism 	$A_{\text{base}} = \frac{1}{2} b l$ $A_{\text{rectangles}} = ah + bh + ch$ $A_{\text{total}} = A_{\text{rectangles}} + 2A_{\text{base}}$ $= ah + bh + ch + bl$	$V = (A_{\text{base}})(\text{height})$ $V = \frac{1}{2} b l h \quad \text{or} \quad V = \frac{b l h}{2}$

# Academic

## Grade 9 Assessment of Mathematics

2010

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2010, Academic).**

Education Quality and  
Accountability Office

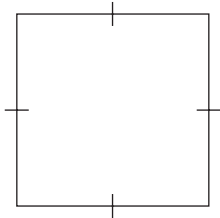


Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

- 1** What is the value of  $6x^2$  when  $x = \frac{1}{3}$ ?

a  $\frac{2}{9}$   
 b  $\frac{2}{3}$   
 c 2  
 d 4

- 2** Chris has a square garden with an area of  $38.4 \text{ m}^2$ , as shown in the diagram.



He decreases the length of each side by 1.7 m to make a smaller garden.

Which is closest to the perimeter of the smaller garden?

a 37 m  
 b 32 m  
 c 25 m  
 d 18 m

- 3** The sum of the perimeters of two shapes is represented by  $13x + 4y$ .

The perimeter of one shape is represented by  $4x - 2y$ .

Which expression represents the perimeter of the other shape?

a  $9x + 2y$   
 b  $9x + 6y$   
 c  $17x + 2y$   
 d  $17x + 6y$

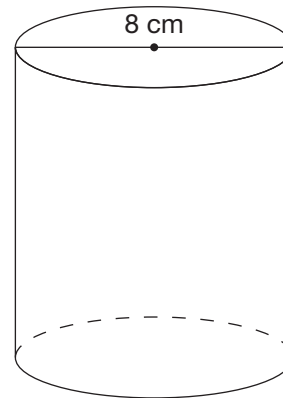
- 4** Consider the expression below.

$$3x^2(5x^2 - 2x + 1)$$

Which of the following is equivalent to this expression?

a  $8x^2 - 2x + 1$   
 b  $8x^2 + x + 4$   
 c  $15x^4 - 2x + 1$   
 d  $15x^4 - 6x^3 + 3x^2$

- 5** The cylinder below has a volume of  $150 \text{ cm}^3$ .



Which of the following is closest to the area of the lateral surface of the cylinder?

**Hint:**

$$V_{\text{cylinder}} = \pi r^2 h$$

$$A_{\text{lateral surface}} = 2\pi r h$$

a  $38 \text{ cm}^2$   
 b  $75 \text{ cm}^2$   
 c  $150 \text{ cm}^2$   
 d  $300 \text{ cm}^2$



**6 Part-Time Job**

Ezre works part-time at a clothing store. He earns \$80 per week plus 6% of the value of his weekly sales.

This week Ezre earns \$119.

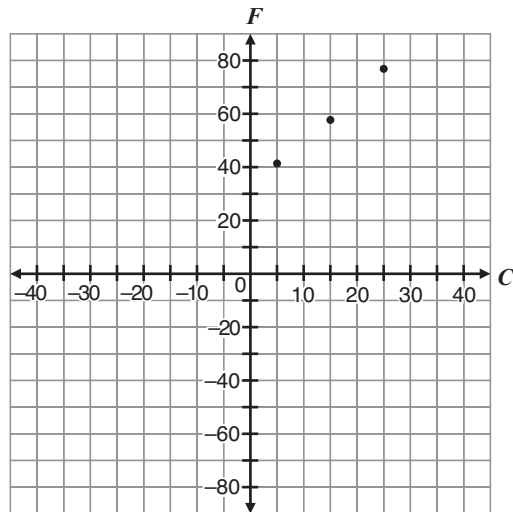
What is the total value of his sales this week?

Show your work.

The total value of his sales is \_\_\_\_\_.

- 7** Consider the following chart and graph.

Temperature in degrees Celsius, $C$	Temperature in degrees Fahrenheit, $F$
$5^{\circ}$	$41^{\circ}$
$15^{\circ}$	$59^{\circ}$
$25^{\circ}$	$77^{\circ}$



What temperature in degrees Celsius is equivalent to  $-20^{\circ}\text{F}$ ?

- a  $-4^{\circ}\text{C}$
  - b  $-18^{\circ}\text{C}$
  - c  $-29^{\circ}\text{C}$
  - d  $-40^{\circ}\text{C}$
- 8** A bus is rented for a class field trip. The transportation cost for the trip is made up of \$225 to rent the bus, \$50 for gas and \$2 for each bus seat.

Which relation below describes the total transportation cost for the trip if  $C$  is the total cost in dollars and  $n$  is the number of seats?

- a  $C = -2n + 225$
- b  $C = -2n + 275$
- c  $C = 2n + 225$
- d  $C = 2n + 275$

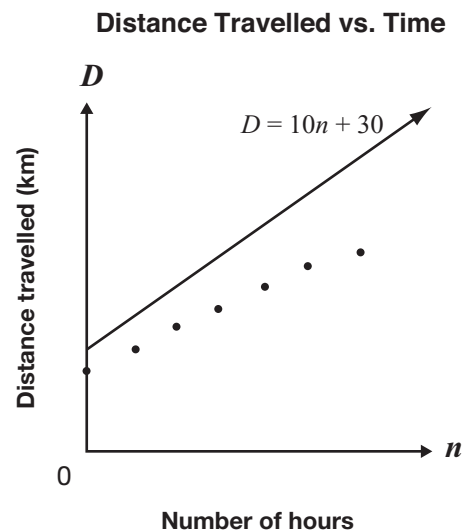
- 9** A sports company uses the equation  $C = 8t + 5$  to represent the relationship between the total amount charged to rent a canoe,  $C$ , in dollars and the rental time,  $t$ , in hours.

What is the initial charge to rent a canoe?

- a \$0
- b \$5
- c \$8
- d \$13

- 10** Data on distance travelled and the number of hours spent travelling are shown on the graph below.

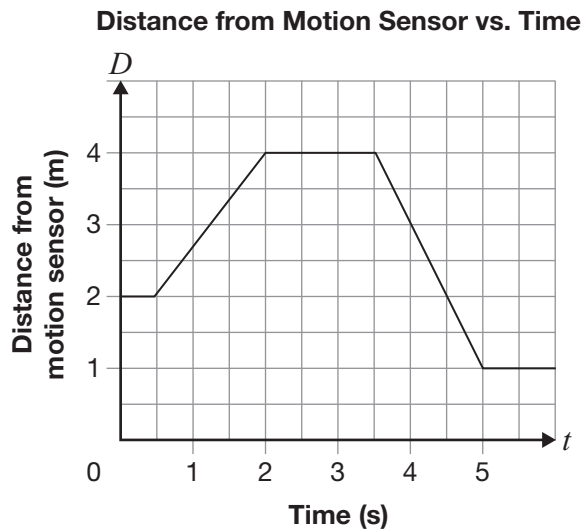
The line  $D = 10n + 30$  is also shown on the graph.



Which equation best represents the line of best fit for the data shown?

- a  $D = 5n + 33$
- b  $D = 8n + 23$
- c  $D = 10n + 18$
- d  $D = 12n + 25$

- 11** Tyler walks along a line leading from a motion sensor. The graph below shows information about Tyler's walk.

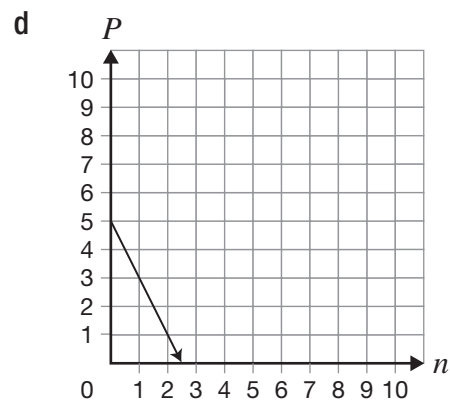
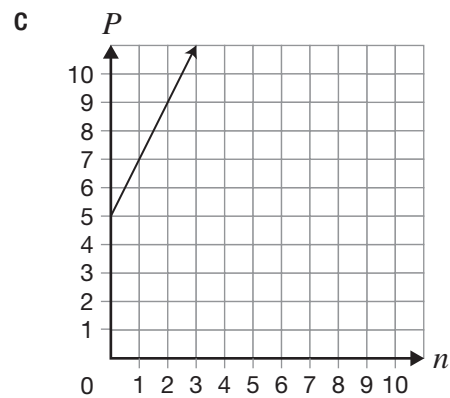
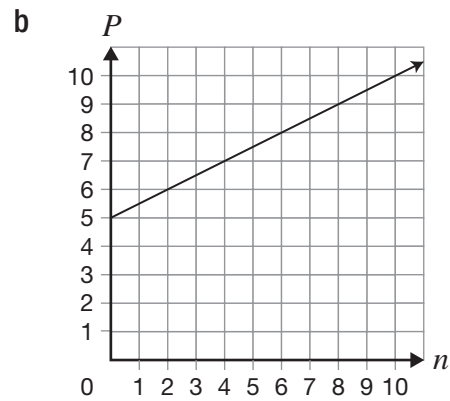
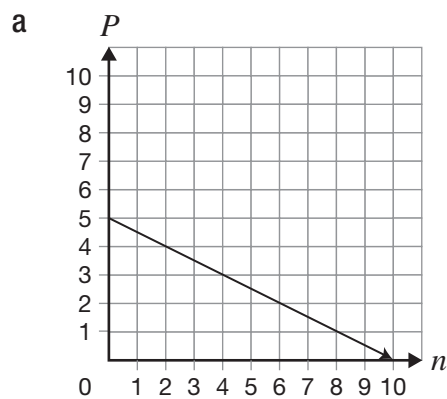


Which of the following is closest to Tyler's speed in metres per second as he walks toward the motion sensor?

- a 2.0
- b 1.3
- c 0.8
- d 0.5

- 12** Which graph represents the equation

$$P = -\frac{1}{2}n + 5?$$



**13 What's the Charge?**

The table below represents the linear relationship between cost and repair time at an appliance store.

Repair time, $t$ (h)	Cost, $C$ (\$)
3	205
6	385
8	505

Determine the initial value of this relationship. Show your work.

Initial value: \_\_\_\_\_

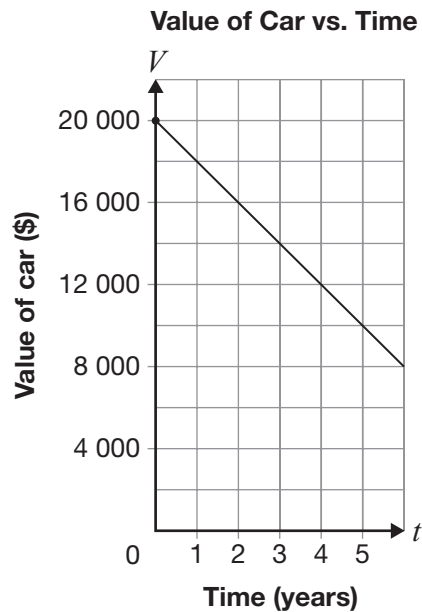
Is this relationship a direct or a partial variation?

Circle one:    Direct variation    Partial variation

Justify your answer.

**14 Hot New Wheels**

Cybelle and Peter each buy a car. The graph below represents the value of Cybelle's car over time.



Peter's car costs less than Cybelle's. The value of both cars changes at the same rate.

Determine a possible equation to represent the relationship between the value of Peter's car,  $V$ , in dollars, and time,  $t$ , in years.

$V =$  \_\_\_\_\_

Justify your equation.

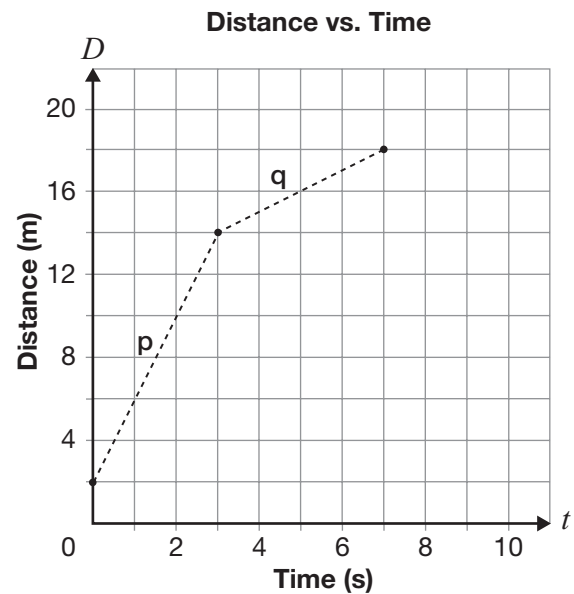
- 15** Which of the following represents an equation of a line?

a  $y = 2^x$   
b  $y = x^2 - 5$   
c  $x^2 + y^2 - 25 = 0$   
d  $2x + 3y - 5 = 0$

- 16** What are the slope,  $m$ , and  $y$ -intercept,  $b$ , of the line represented by  $3x - 2y + 16 = 0$ ?

a  $m = \frac{3}{2}, b = 8$   
b  $m = \frac{2}{3}, b = -16$   
c  $m = -\frac{2}{3}, b = -8$   
d  $m = -\frac{3}{2}, b = 16$

- 17** The graph below represents the relationship between distance and time on Javier's walk.



How much greater is Javier's speed in section p than in section q?

a 0.5 m/s  
b 1.5 m/s  
c 2.0 m/s  
d 3.0 m/s

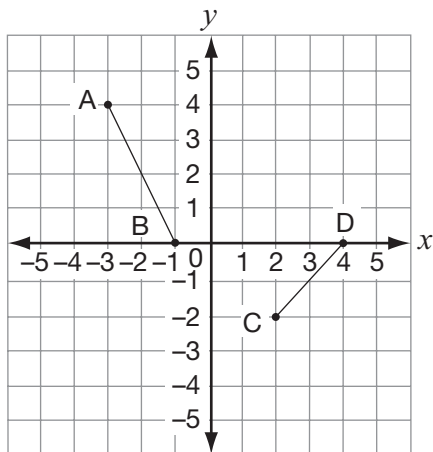
- 18** The total cost of hiring Beth's Plumbing Services is represented by the equation  $C = 50t + 70$ , where  $C$  is the total cost in dollars and  $t$  is the time in hours.

Next month, the rate will change to \$60 per hour, but the initial charge will stay the same.

Which of the following describes how the graph of the relation will change?

a The steepness of the line will increase.  
b The steepness of the line will decrease.  
c The vertical intercept will increase by 10 units.  
d The vertical intercept will decrease by 10 units.

- 19 Consider the following graph.



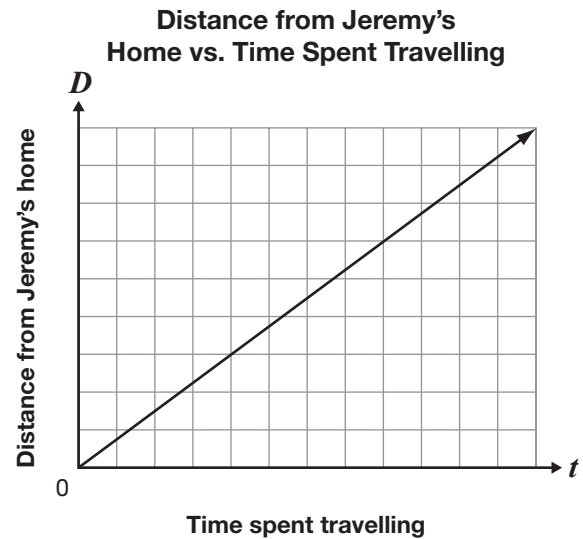
Which statement is **false**?

- a The slope of AB is  $-2$ .
- b The slope of CD is  $1$ .
- c The  $y$ -intercept of the line through CD is  $-4$ .
- d The  $y$ -intercept of the line through AB is  $-1$ .

- 20 Janelle draws a line that passes through the points  $(-1, 6)$  and  $(0, 3)$ . If Janelle writes the equation of the line in  $y = mx + b$  form, what are the values of  $m$  and  $b$ ?

- a  $m = -9$   
 $b = 3$
- b  $m = -3$   
 $b = 6$
- c  $m = -9$   
 $b = 6$
- d  $m = -3$   
 $b = 3$

- 21 Last weekend, Jeremy travelled from his home to a friend's house. The graph below represents the relation between  $D$ , the distance from Jeremy's home, and  $t$ , the time spent travelling to his friend's house.



This weekend, Jeremy travels to his friend's house but leaves from school. Jeremy's school is between his house and his friend's house.

If he travels at a faster rate this weekend, how will the line representing this trip compare to the line representing the previous trip?

This new line will

- a start at a higher point and be steeper.
- b start at a higher point and be less steep.
- c start at the current point and be steeper.
- d start at the current point and be less steep.

**22 The New Line**

A line has

- the same slope as the line represented by  $4x - 3y + 15 = 0$  and
- the same  $y$ -intercept as the line represented by  $2x + y + 6 = 0$ .

Determine an equation of this line.

Show your work.



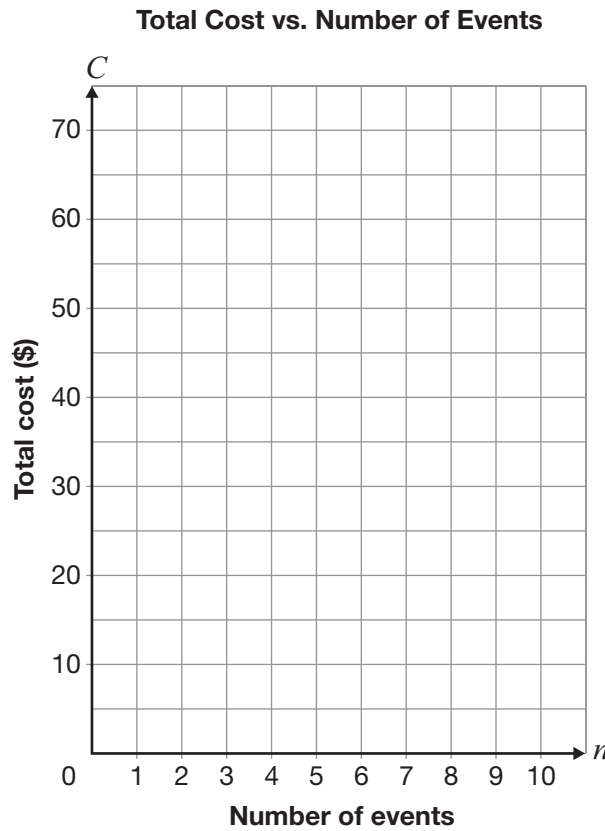
**23 Event-full**

At Lowell High School, the cost to attend special events depends on whether or not a student has purchased a \$10 discount card.

Option A: The student buys a discount card. The cost is \$5 per event.

Option B: The student does not buy a discount card. The cost is \$7.50 per event.

Graph the relationship between total cost and number of events for each option on the grid.



Determine the conditions under which a student at Lowell High School should choose each option.

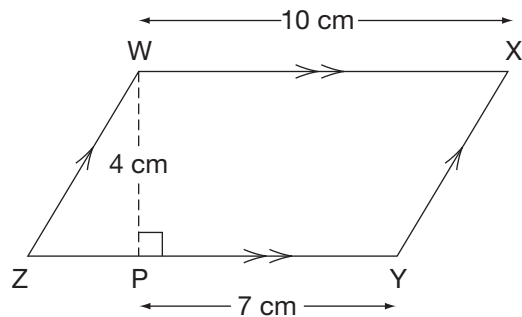
Justify your answer.

- 24** Ella wants a rectangle with
- a perimeter of 100 cm and
  - the largest possible area.

What are the dimensions of the rectangle that satisfies her conditions?

- a  $10\text{ cm} \times 10\text{ cm}$
- b  $20\text{ cm} \times 30\text{ cm}$
- c  $25\text{ cm} \times 25\text{ cm}$
- d  $40\text{ cm} \times 60\text{ cm}$

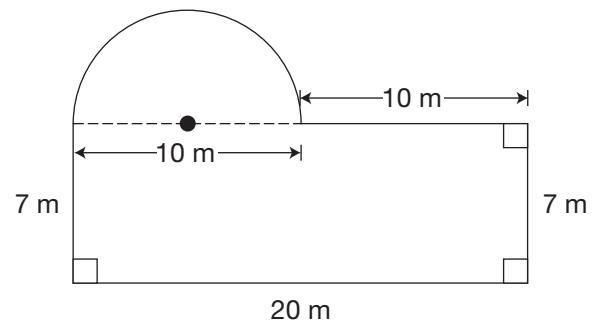
- 25** Consider the parallelogram shown below.



What is the perimeter of WXYZ?

- a 28 cm
- b 30 cm
- c 31 cm
- d 34 cm

- 26** A garden is in the shape of a rectangle and a semicircle as shown below.

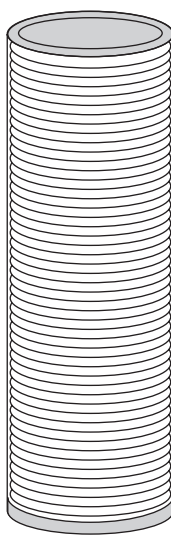


Which of the following is closest to the amount of fencing needed to enclose the garden?

- a 60 m
- b 70 m
- c 75 m
- d 85 m



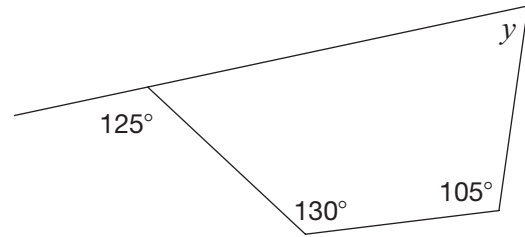
- 27** The playing chips of a board game are stored in cylindrical plastic cases. The plastic cases have a volume of  $25\,120\text{ mm}^3$  and a diameter of 40 mm.

**Playing Chip** $\leftarrow 40\text{ mm} \rightarrow$ **Plastic Case** $\leftarrow 40\text{ mm} \rightarrow$ 

Which of the following is closest to the height of one playing chip if 50 playing chips can fit tightly into the plastic case as shown above?

- a 0.1 mm
- b 0.4 mm
- c 1.3 mm
- d 2.5 mm

- 28** Consider the diagram below.



Which of the following is the value of  $y$  in the diagram?

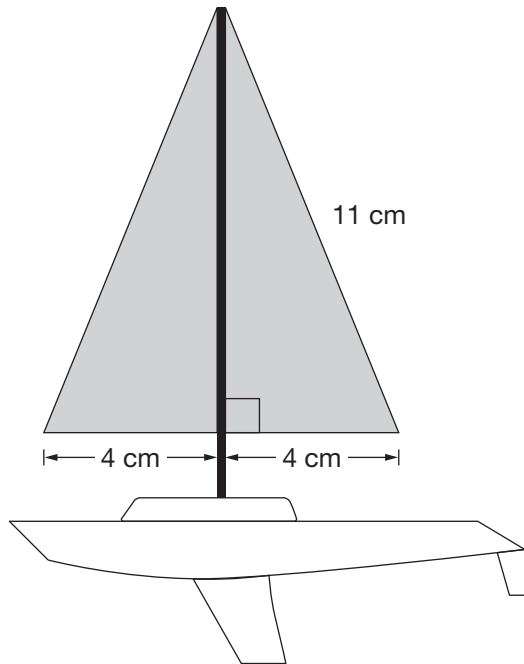
- a  $55^\circ$
- b  $70^\circ$
- c  $125^\circ$
- d  $130^\circ$

- 29** What is the sum of the interior angles of a 12-sided regular polygon?

- a  $1080^\circ$
- b  $1800^\circ$
- c  $1980^\circ$
- d  $2160^\circ$

**30 Toy Sailboats**

Emelina makes toy sailboats as shown below.

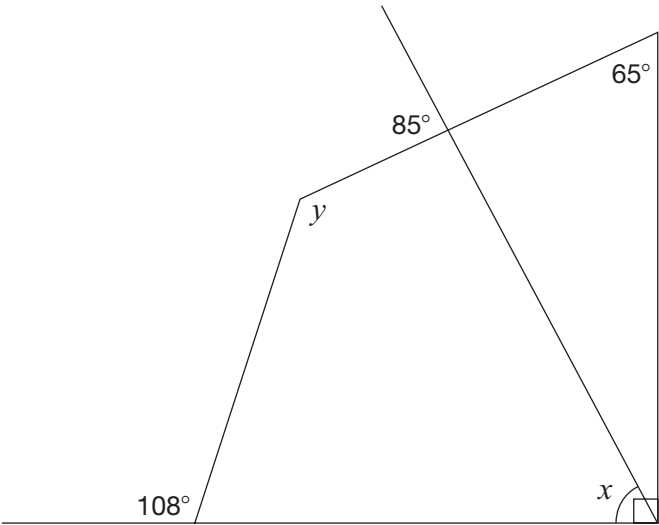


Determine the total area of the shaded sails.

Show your work.

**31 What's Missing?**

Consider the diagram below.



Complete the table below.

Justify your answers using geometric properties.

Angle measure	Justification
$x = \underline{\hspace{2cm}}$	
$y = \underline{\hspace{2cm}}$	



## Sample Assessment Questions: Academic

### Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored zero.
- If you leave a question blank, the question will be scored zero.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. (a) (b) (c) (d)
6. Respond in booklet.
7. (a) (b) (c) (d)
8. (a) (b) (c) (d)

9. (a) (b) (c) (d)
10. (a) (b) (c) (d)
11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. Respond in booklet.
14. Respond in booklet.
15. (a) (b) (c) (d)
16. (a) (b) (c) (d)

17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. (a) (b) (c) (d)
22. Respond in booklet.
23. Respond in booklet.
24. (a) (b) (c) (d)

25. (a) (b) (c) (d)
26. (a) (b) (c) (d)
27. (a) (b) (c) (d)
28. (a) (b) (c) (d)
29. (a) (b) (c) (d)
30. Respond in booklet.
31. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_





# Academic

## Grade 9 Assessment of Mathematics

Winter 2009

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Winter 2009, Academic).**

Education Quality and  
Accountability Office

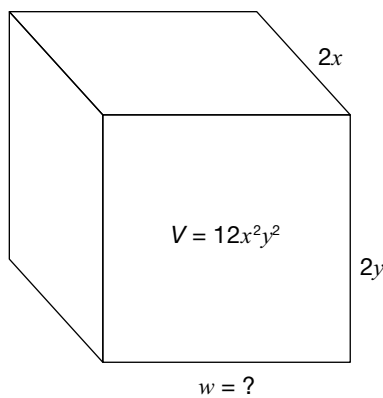


Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

**1** What is the value of  $(x^2)^3$  when  $x = \frac{1}{2}$ ?

- a  $\frac{1}{4}$
- b  $\frac{1}{12}$
- c  $\frac{1}{32}$
- d  $\frac{1}{64}$

**2** A box with a volume of  $12x^2y^2$  is shown below.

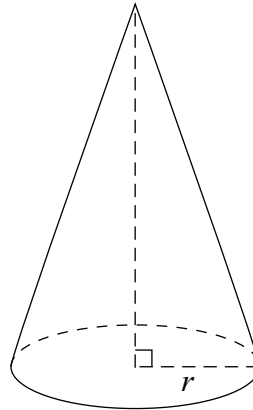


Hint:  $V = lwh$

What is the width of the box?

- a  $2xy$
- b  $3xy$
- c  $4x^3y^3$
- d  $8x^3y^3$

**3** The cone shown below is 20 cm high and has a total volume of  $1000 \text{ cm}^3$ .



Which of the following is closest to the length of the radius,  $r$ ?

- a 6.9 cm
- b 6.2 cm
- c 4.0 cm
- d 2.3 cm

**4** Alfredo and his wife, Jody, work in a restaurant.

Last week Alfredo received an average of \$15 in tips for each of the 55 tables he served. Jody received an average of \$20 in tips for each of the 60 tables she served.

They are planning a weekend trip. Alfredo will pay a total of \$220 for their hotel room and Jody will pay a total of \$160 for their rental car.

How much of their combined tips will be left over after they have paid for their hotel room and rental car?

- a \$1620
- b \$1645
- c \$2025
- d \$2405

**5 CD Sell-Off**

Juan belongs to a CD club that sells CDs for \$11.44 each before tax. His first shipment of CDs costs \$90.49 including 13% tax.

How many CDs are in his first shipment?

Show your work.



- 6** Which table of values represents a linear relation?

**a**

$x$	$y$
1	$\frac{1}{3}$
2	$\frac{2}{3}$
3	1
4	$\frac{4}{3}$

**b**

$x$	$y$
0	5
5	7
10	10
15	14

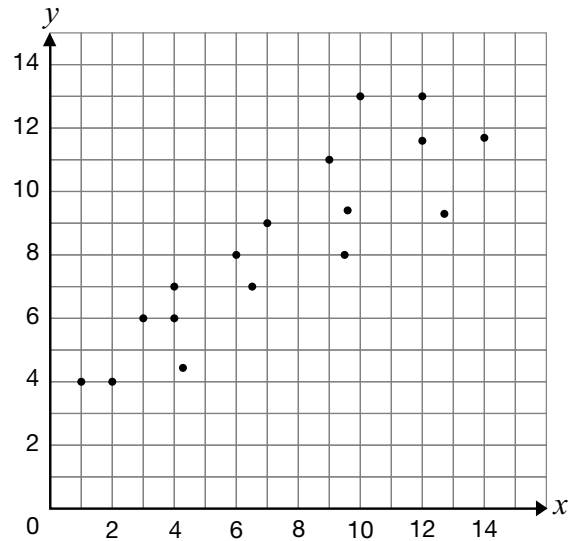
**c**

$x$	$y$
1	2
2	4
3	8
4	16

**d**

$x$	$y$
0	$\frac{1}{2}$
5	$\frac{1}{4}$
10	$\frac{1}{6}$
15	$\frac{1}{8}$

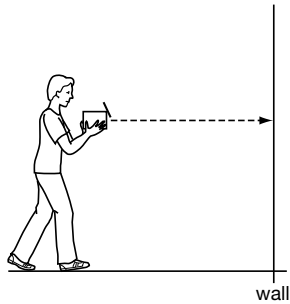
- 7** Which of the following could be the slope of a line of best fit for the data shown in the scatter plot below?



- a**  $-2$   
**b**  $-1$   
**c**  $1$   
**d**  $2$

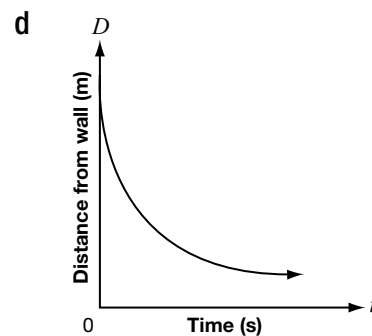
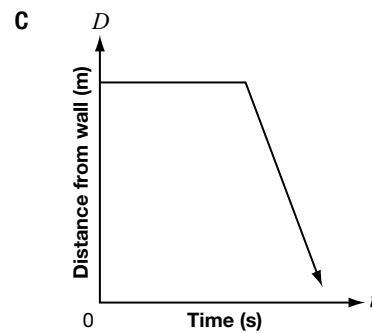
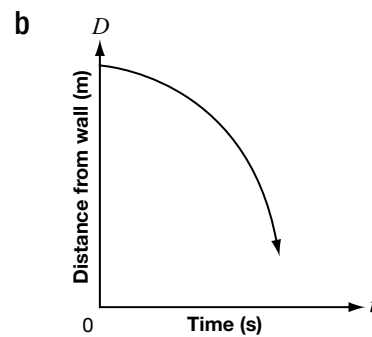
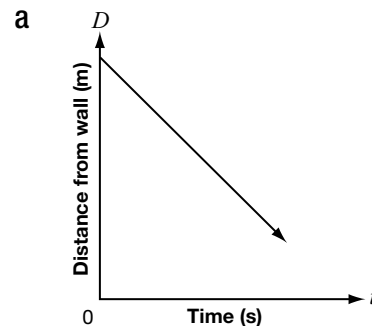


- 8** In an investigation, a student holds a motion detector, points it at a wall and walks toward the wall.



The student walks slowly at first and then speeds up as he approaches the wall.

Which of the following graphs would be produced on the graphing calculator?



- 9** The table of values below displays the cost of renting a bicycle.

Time, $t$ (h)	Cost, $C$ (\$)
0	25
1	30
2	35
3	40

Which equation models the cost of renting a bicycle?

- a  $C = 5t$
- b  $C = 25t$
- c  $C = 5t + 25$
- d  $C = 25t + 5$



**10 Picture Perfect**

The cost of producing a family photo album is \$0.50 per photo, plus a fixed cost for the album. Circle the table below that represents this scenario.

**Option 1**

Number of photos, $p$	Cost, $C$
5	\$2.50
10	\$5.00
15	\$7.50
20	\$10.00

**Option 2**

Number of photos, $p$	Cost, $C$
5	\$35.50
10	\$36.00
15	\$36.50
20	\$37.00

**Option 3**

Number of photos, $p$	Cost, $C$
5	\$37.50
10	\$40.00
15	\$42.50
20	\$45.00

Justify your choice and include an explanation of why you did not choose the other options.



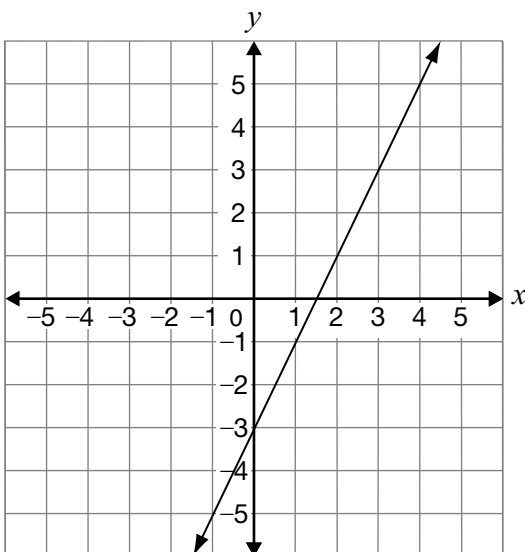
**11** Which of the following statements is true for the line  $5x - 2y - 12 = 0$ ?

- a The slope is  $\frac{2}{5}$  and the  $y$ -intercept is 12.
- b The slope is  $-5$  and the  $y$ -intercept is 6.
- c The slope is 5 and the  $y$ -intercept is  $-12$ .
- d The slope is  $\frac{5}{2}$  and the  $y$ -intercept is  $-6$ .

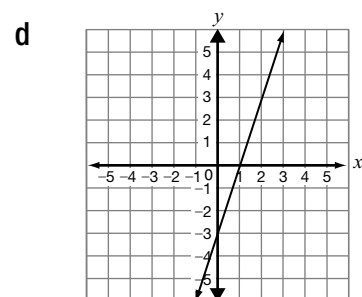
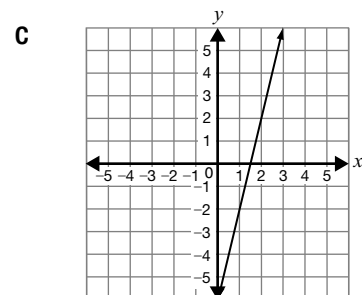
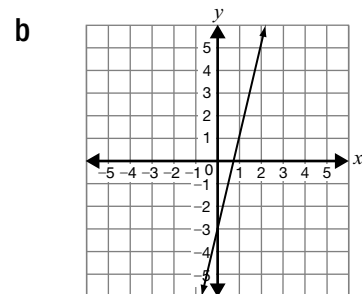
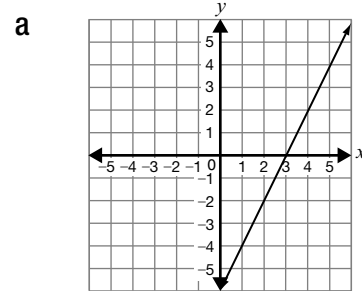
**12** For the slope of a line, the change in  $x$  is greater than the change in  $y$ . Which of the following could represent the slope of this line?

- a  $\frac{4}{3}$
- b 2
- c 1
- d  $\frac{2}{5}$

**13** The graph of a line is shown below.

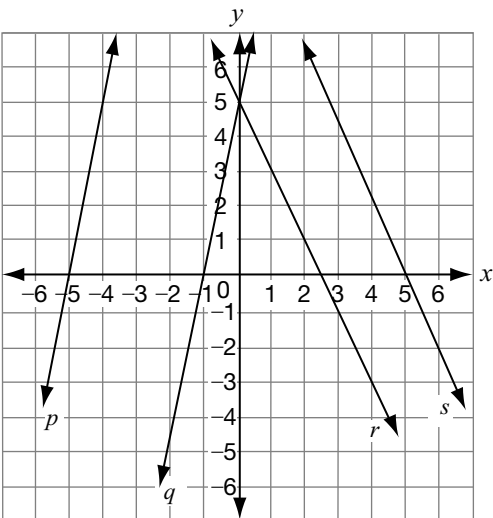


If the slope is doubled and the  $y$ -intercept remains constant, which graph below best represents the new line?





- 14** Consider the following linear relations.



Which line represents the graph of the equation  $y = -2x + 5$ ?

- a Line  $p$
  - b Line  $q$
  - c Line  $r$
  - d Line  $s$
- 15** The following table shows values for a linear relation.

$x$	$y$
-15	-33
-9	-25
3	-9
12	3

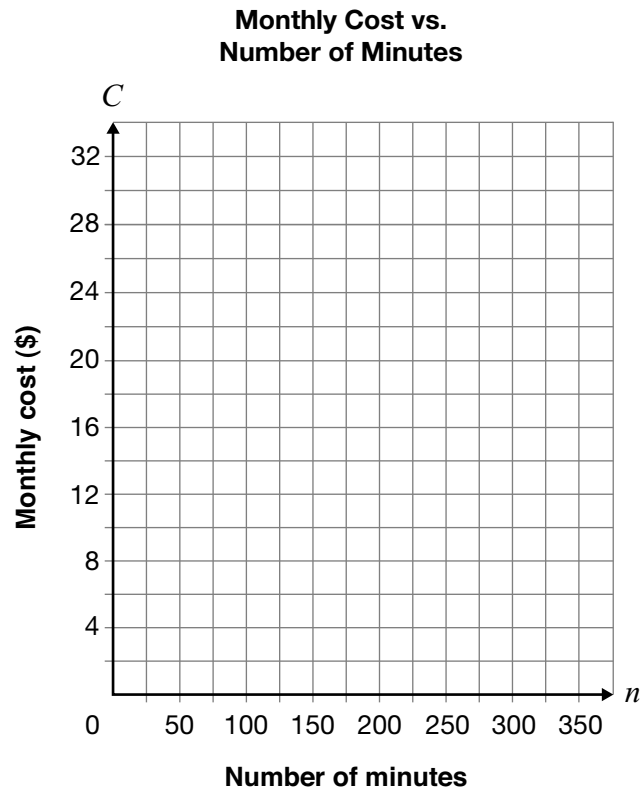
Which of the following equations represents the relationship shown in the table of values?

- a  $y = \frac{4}{3}x - 16$
- b  $y = \frac{4}{3}x - 13$
- c  $y = \frac{3}{4}x - 9$
- d  $y = \frac{3}{4}x - 6$



**16 Cellphone Plans**

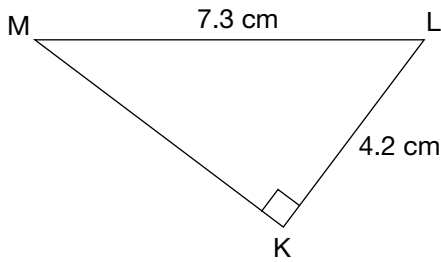
Serge is choosing a cellphone plan and wants the lowest cost. Cell-a-Bration charges \$12 per month plus \$0.05 per minute for cellphone service. E-Phone charges \$28 per month for unlimited minutes.



Determine under which conditions Serge should choose Cell-a-Bration and under which conditions Serge should choose E-Phone.

Justify your answer.

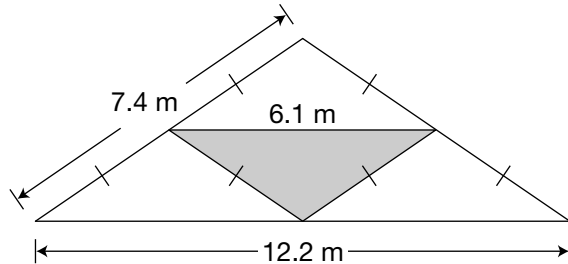
- 17** Triangle KLM is shown below.



Which of the following is closest to the perimeter of triangle KLM?

- a 12.6 cm
- b 16.3 cm
- c 17.5 cm
- d 21.0 cm

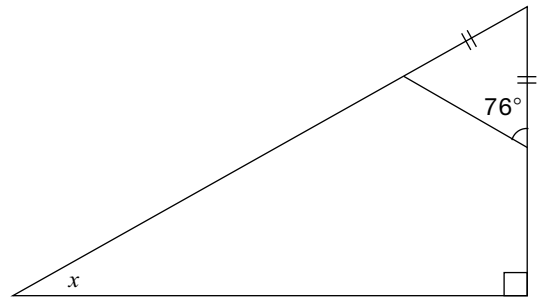
- 18** The frame of the roof of a small house is being constructed. A portion of the frame consists of four isosceles triangles as shown below.



What is the total length of the three sides that form the shaded interior triangle?

- a 3.7 m
- b 6.1 m
- c 13.5 m
- d 18.3 m

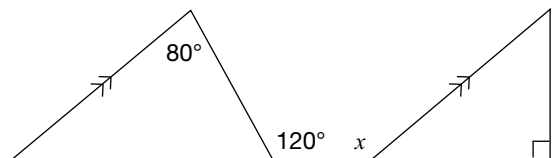
- 19** Consider the following diagram.



What is the value of  $x$ ?

- a  $14^\circ$
- b  $28^\circ$
- c  $62^\circ$
- d  $76^\circ$

- 20** Consider the diagram below.

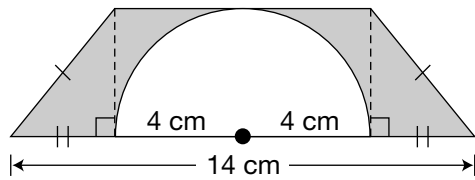


What is the value of  $x$ ?

- a  $80^\circ$
- b  $120^\circ$
- c  $140^\circ$
- d  $170^\circ$

**21 Something's Missing**

The semicircle in the diagram below has a radius of 4 cm.



What is the area of the shaded region?

Show your work.

**Education Quality and  
Accountability Office**



2 Carlton Street, Suite 1200, Toronto ON M5B 2M9

Telephone: 1-888-327-7377 Web site: [www.eqao.com](http://www.eqao.com)

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# Sample Assessment Questions: Academic

## Student Answer Sheet

Enter your multiple-choice answers on this sheet.

- To indicate your answer, use an HB pencil to fill in the circle completely, as shown below:

Like this: ● Not like this: ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored incorrect.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. Respond in booklet.

6. (a) (b) (c) (d)
7. (a) (b) (c) (d)
8. (a) (b) (c) (d)
9. (a) (b) (c) (d)
10. Respond in booklet.

11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. (a) (b) (c) (d)

16. Respond in booklet.
17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_

# Academic

## Grade 9 Assessment of Mathematics

Spring 2009

### **SAMPLE ASSESSMENT QUESTIONS**

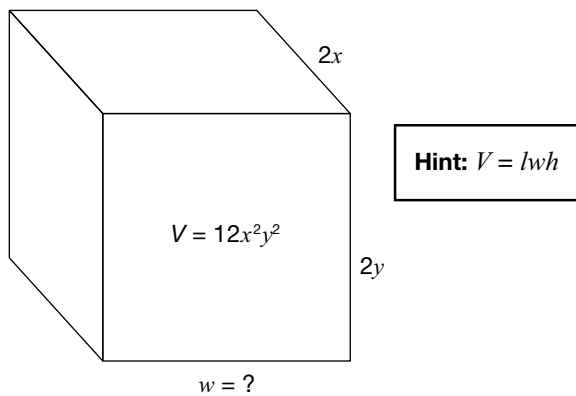
**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Spring 2009, Academic).**

Education Quality and  
Accountability Office



Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

- 1** A box with a volume of  $12x^2y^2$  is shown below.



What is the width of the box?

- a  $2xy$
  - b  $3xy$
  - c  $4x^3y^3$
  - d  $8x^3y^3$
- 2** Which of the following is equivalent to the expression below?

$$(4x - 5) + (2x + 1)$$

- a  $2x - 6$
- b  $2x - 4$
- c  $6x - 6$
- d  $6x - 4$

- 3** Alfredo and his wife, Jody, work in a restaurant.

Last week Alfredo received an average of \$15 in tips for each of the 55 tables he served. Jody received an average of \$20 in tips for each of the 60 tables she served.

They are planning a weekend trip. Alfredo will pay a total of \$220 for their hotel room and Jody will pay a total of \$160 for their rental car.

How much of their combined tips will be left over after they have paid for their hotel room and rental car?

- a \$1620
- b \$1645
- c \$2025
- d \$2405



**4 Keepin' Tabs**

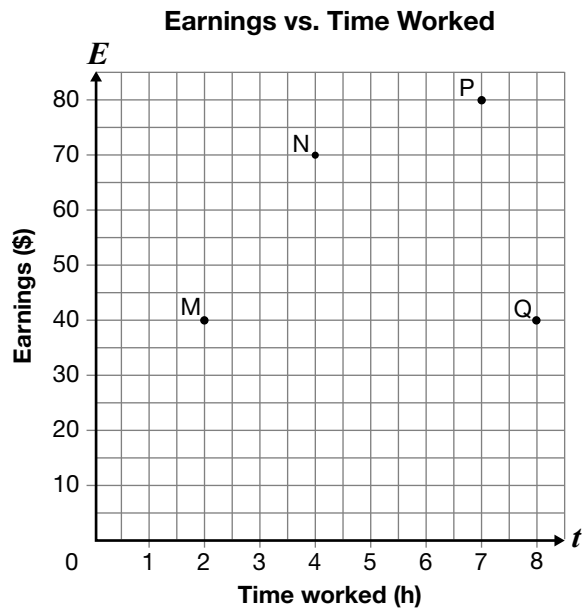
A student council collects aluminum pop tabs to raise money to purchase a wheelchair. A company buys the pop tabs for \$0.88 per kilogram.

If 1267 pop tabs have a mass of one pound, how many pop tabs are needed to purchase a wheelchair worth \$1500?

Show your work.

**Hint:** $1 \text{ kilogram} = 2.2 \text{ pounds}$ 

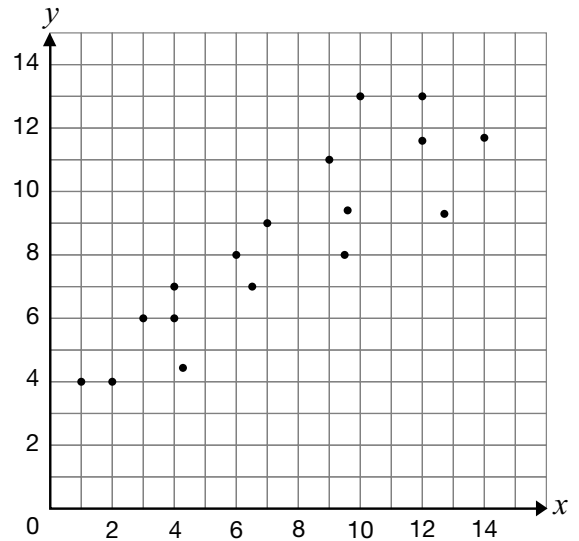
- 5** The graph below represents the relationship between earnings and time worked.



Which of the following points represents the highest rate of pay?

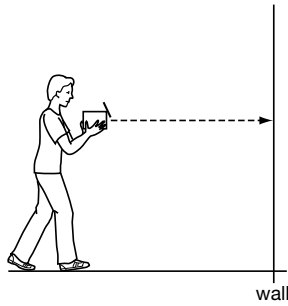
- a M
- b N
- c P
- d Q

- 6** Which of the following could be the slope of a line of best fit for the data shown in the scatter plot below?



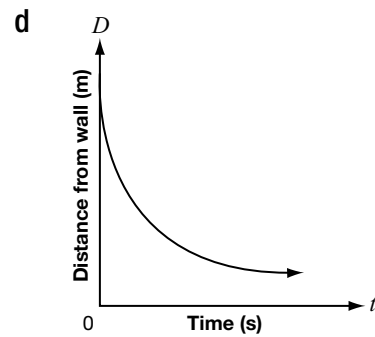
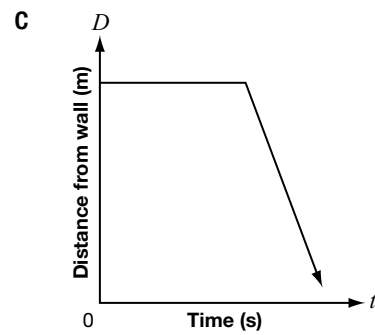
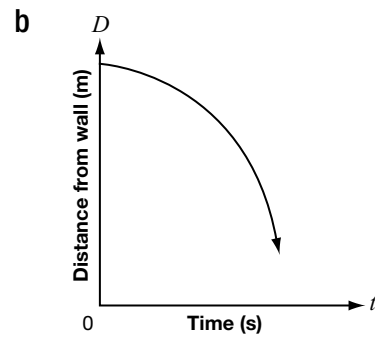
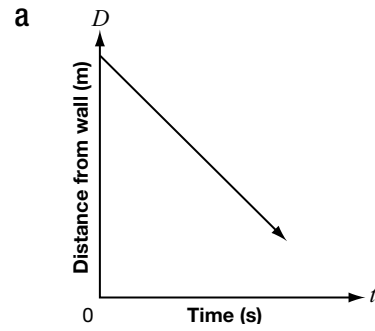
- a -2
- b -1
- c 1
- d 2

- 7** In an investigation, a student holds a motion detector, points it at a wall and walks toward the wall.



The student walks slowly at first and then speeds up as he approaches the wall.

Which of the following graphs would be produced on the graphing calculator?



- 8** The table of values below displays the cost of renting a bicycle.

Time, $t$ (h)	Cost, $C$ (\$)
0	25
1	30
2	35
3	40

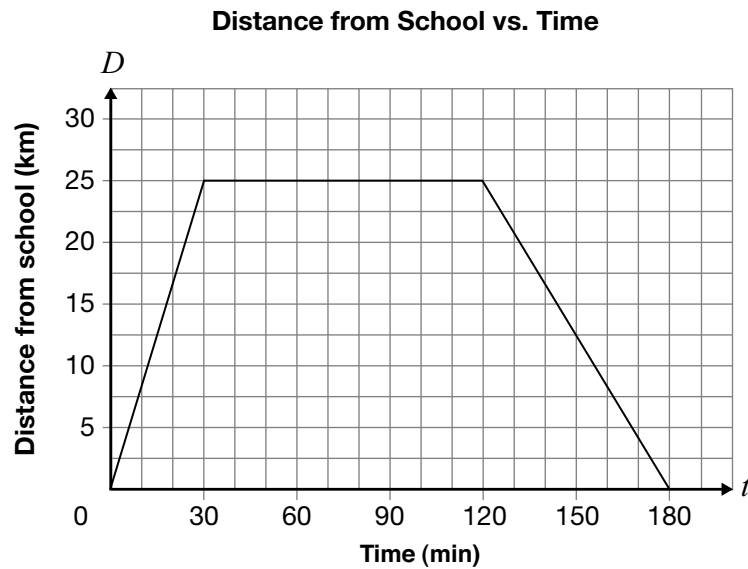
Which equation models the cost of renting a bicycle?

- a  $C = 5t$
- b  $C = 25t$
- c  $C = 5t + 25$
- d  $C = 25t + 5$



**9 Dogs Versus Cats**

The Bryant Bulldogs basketball team takes the bus to play the Jordan High Thundercats.



Describe the three parts of the Bulldogs' bus trip, using the information on the graph.

Include information about distance, time, direction and speed in kilometres per minute for each section of the graph.

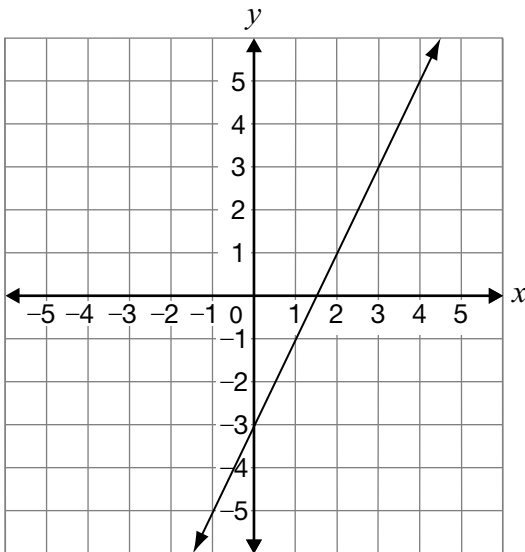
- 10** Which of the following equations does **not** represent a linear relation?

- a  $x = -2$
- b  $y = 3x - 1$
- c  $y = x^2 + 3$
- d  $3x - 2y - 1 = 0$

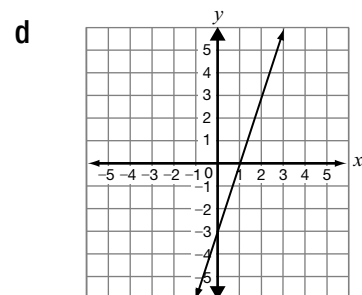
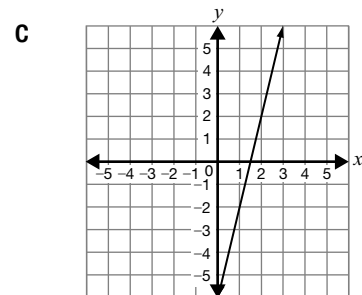
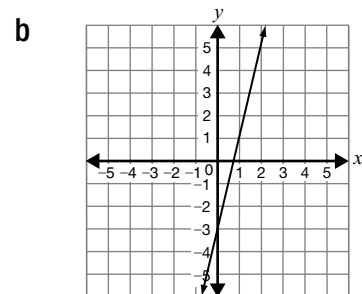
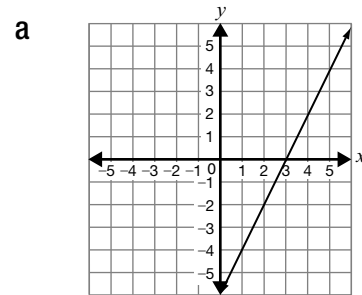
- 11** For the slope of a line, the change in  $x$  is greater than the change in  $y$ . Which of the following could represent the slope of this line?

- a  $\frac{4}{3}$
- b 2
- c 1
- d  $\frac{2}{5}$

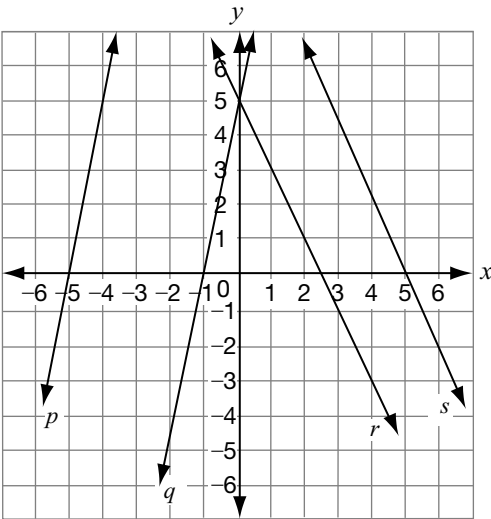
- 12** The graph of a line is shown below.



If the slope is doubled and the  $y$ -intercept remains constant, which graph below best represents the new line?



- 13** Consider the following linear relations.



Which line represents the graph of the equation  $y = -2x + 5$ ?

- a Line  $p$
  - b Line  $q$
  - c Line  $r$
  - d Line  $s$
- 14** The following table shows values for a linear relation.

$x$	$y$
-15	-33
-9	-25
3	-9
12	3

Which of the following equations represents the relationship shown in the table of values?

- a  $y = \frac{4}{3}x - 16$
- b  $y = \frac{4}{3}x - 13$
- c  $y = \frac{3}{4}x - 9$
- d  $y = \frac{3}{4}x - 6$



**15 A Tale of Two Lines**

Below are the equations of two lines.

Line A:  $x - 2y + 8 = 0$

Line B:  $2x + y + 1 = 0$

Compare the two lines by considering their slopes.

Justify your answer.

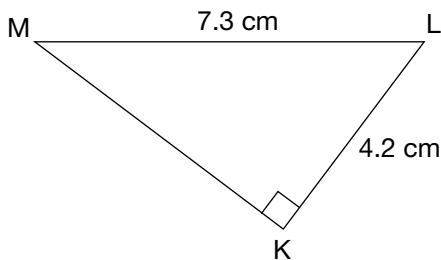
**Hint:**

Include information about

- steepness,
- direction and
- whether the lines are parallel or perpendicular, or whether they are neither.

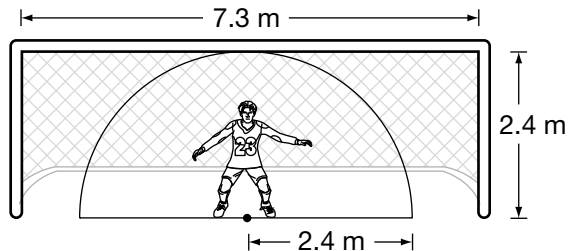


- 16** Triangle KLM is shown below.



Which of the following is closest to the perimeter of triangle KLM?

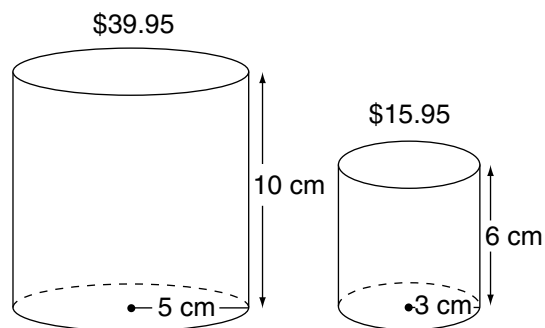
- a 12.6 cm
  - b 16.3 cm
  - c 17.5 cm
  - d 21.0 cm
- 17** A soccer goalie is standing in a goal opening. From this position, she can guard the area represented by the semicircle below.



How much of the goal opening is she not guarding?

- a  $0.6 \text{ m}^2$
- b  $8.5 \text{ m}^2$
- c  $9.0 \text{ m}^2$
- d  $26.6 \text{ m}^2$

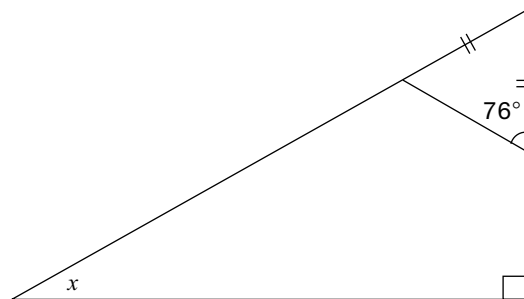
- 18** Two different stores sell coffee in cylindrical packages. The prices and dimensions of the packages from the two stores are shown below.



Which is closest to the difference between the unit prices of these two packages?

- a  $\$0.04/\text{cm}^3$
- b  $\$0.05/\text{cm}^3$
- c  $\$0.09/\text{cm}^3$
- d  $\$0.24/\text{cm}^3$

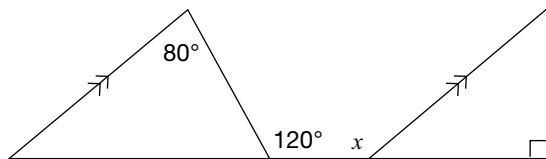
- 19** Consider the following diagram.



What is the value of  $x$ ?

- a  $14^\circ$
- b  $28^\circ$
- c  $62^\circ$
- d  $76^\circ$

- 20** Consider the diagram below.



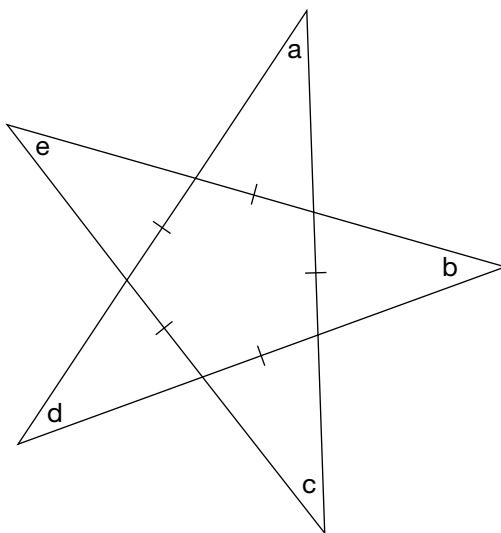
What is the value of  $x$ ?

- a  $80^\circ$
- b  $120^\circ$
- c  $140^\circ$
- d  $170^\circ$



**21 Twinkle Twinkle**

Nicole notices the star design shown below on the pavement outside a movie theatre.



Determine the sum of the angle measures in the corners of this star:  $a + b + c + d + e$ .

Justify your answer using geometric properties.

# Sample Assessment Questions: Academic

## Student Answer Sheet

Enter your multiple-choice answers on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown below:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored incorrect.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. Respond in booklet.

5. (a) (b) (c) (d)

6. (a) (b) (c) (d)

7. (a) (b) (c) (d)

8. (a) (b) (c) (d)

9. Respond in booklet.

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12. (a) (b) (c) (d)

13. (a) (b) (c) (d)

14. (a) (b) (c) (d)

15. Respond in booklet.

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17. (a) (b) (c) (d)

18. (a) (b) (c) (d)

19. (a) (b) (c) (d)

20. (a) (b) (c) (d)

21. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_

# Academic

## Grade 9 Assessment of Mathematics

Winter 2008

### **SAMPLE ASSESSMENT QUESTIONS**

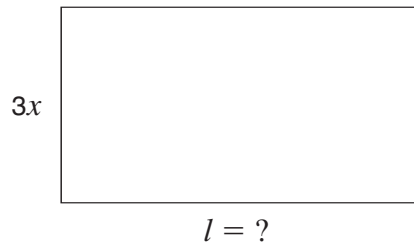
**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Winter 2008, Academic).**

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Please note: The format of these booklets is slightly different from that used for the assessment. The items themselves remain the same.

- 1** The area of the rectangle shown below is  $6xy^2$  square units.



**Hint:**  $A = lw$

If the width is  $3x$  units, which expression represents the length of the rectangle?

- a  $2xy^2$  units
  - b  $2y^2$  units
  - c  $3xy^2$  units
  - d  $3y^2$  units
- 2** The expression below can be simplified.

$$\frac{(x^2y)^3}{(xy)^2}$$

Which of the following shows the expression in its simplest form?

- a  $x^4y$
- b  $x^4$
- c  $xy$
- d  $x^3y$

- 3** Josie works in a sports store. She receives 8% of the total sales each day. One day, she receives \$35 for her portion of the total sales. What are the total sales for that day?

- a \$37.80
- b \$43.75
- c \$280.00
- d \$437.50

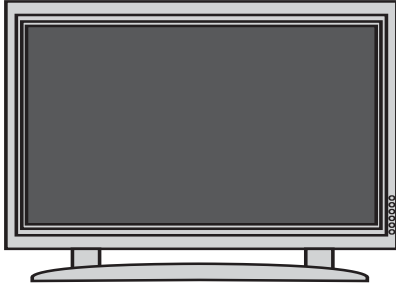
- 4** Which of the following represents the expression  $2(3x + 4) + 3(x - 1)$  in a simplified form?

- a  $9x + 3$
- b  $9x + 5$
- c  $8x + 8$
- d  $8x + 11$



**5 Competing Sales**

Sam is interested in buying a TV. At Fair Deal, the TV is regularly priced at \$599.99 and is on sale for 20% off the regular price. At Big Big Discount, the same TV is regularly priced at \$899.99 and is on sale for 30% off the regular price.

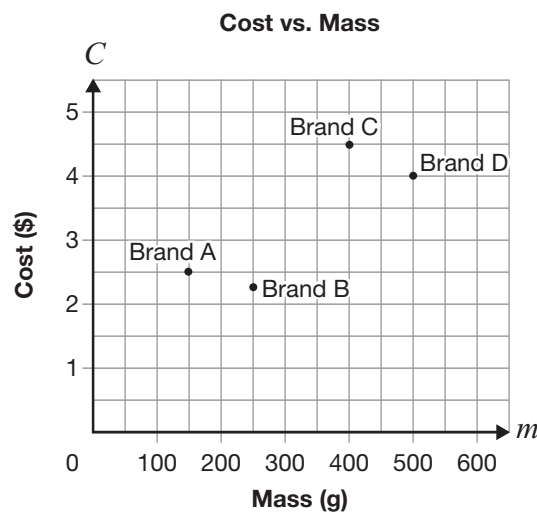


What is the difference in the sale price of the TV between these two stores?

Show your work.



- 6** The following graph shows the relationship between the mass and the cost of four different brands of strawberry jam.



Which statement is true?

- a Brand A has the lowest cost.
- b Brand B has the smallest mass.
- c Brand C has the highest cost per gram.
- d Brand D has the lowest cost per gram.

- 7** Gerry has a table of values representing a linear relation. Two of the numbers are hidden behind a ketchup spill.

<i>x</i>	<i>y</i>
-2	-6
-1	
0	
1	18

The values that are hidden are

- a -2 and 14.
- b 0 and 12.
- c 2 and 10.
- d 3 and 9.

- 8** Nadia lives 11.4 km from school and rides her bike to school every day.

The equation  $d = 11.4 - 0.6t$  represents the relationship between  $d$ , her distance from school in km, and  $t$ , her time spent travelling in minutes.

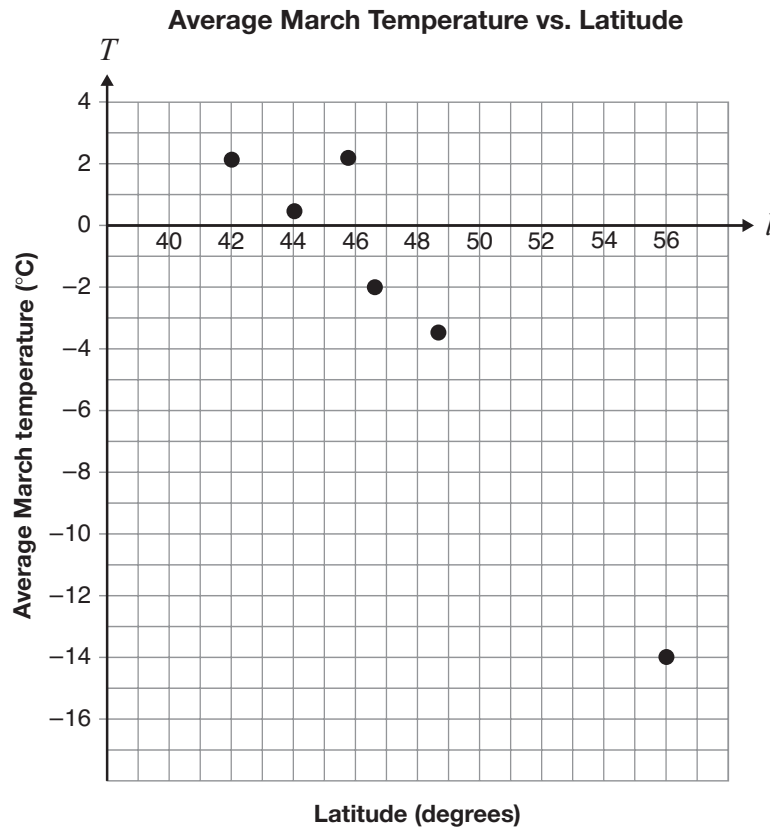
If she leaves home at 8:05 a.m., what time will she get to school?

- a 8:11 a.m.
- b 8:16 a.m.
- c 8:17 a.m.
- d 8:24 a.m.



**9 March Temperatures**

The average March temperatures for six Ontario communities are plotted according to their latitudes on the following scatter plot.



The city of Kenora has a latitude of  $50^\circ$  and has an average March temperature of  $-6.3^\circ\text{C}$ . Does the community of Kenora follow the trend of the data?

Justify your answer.

- 10** The table below shows examples of linear and non-linear equations.

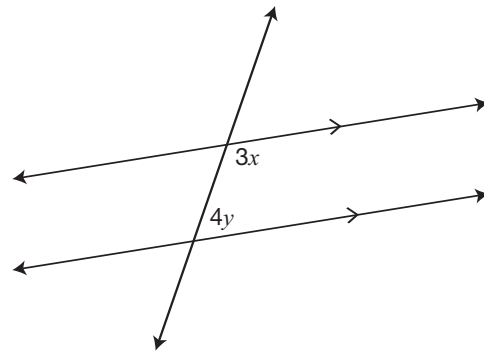
Equation Examples

Linear equations	Non-linear equations
$y = 5x - 3$	$y = 5x^2 - 3$
$y = 125 - 4.25x$	$y = 2x^3$
$y = -3x$	$2x^2 + 5y^2 = 10$

Which of these statements best describes how linear equations are different from non-linear equations in the table above?

- a The exponent of both variables in the linear equations is 1.
- b The exponent of exactly one variable in the linear equations is 1.
- c The exponent of both variables in the non-linear equations is 1.
- d The exponent of exactly one variable in the non-linear equations is 1.

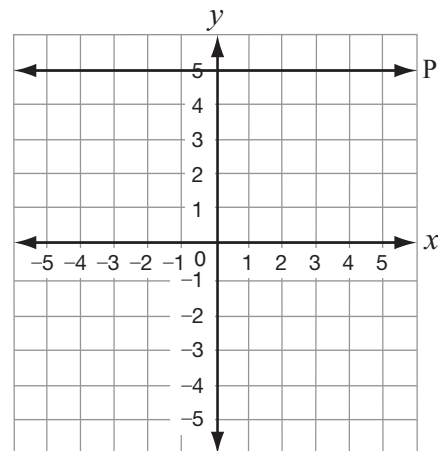
- 11** The relation shown below can be expressed as  $3x + 4y - 180 = 0$ .



Another way to write this relation is

- a  $y = \frac{3}{4}x - 45$ .
- b  $y = -\frac{3}{4}x + 45$ .
- c  $y = -\frac{4}{3}x + 60$ .
- d  $y = \frac{4}{3}x - 60$ .

- 12** Line P is shown below.



Which equation represents Line P?

- a  $x = 5$
- b  $y = 5$
- c  $y = x + 5$
- d  $x = y + 5$

**13** What is the equation of the line that passes through the points (2, 4) and (4, 0)?

**a**  $y = -\frac{1}{2}x + 2$

**b**  $y = -\frac{1}{2}x + 5$

**c**  $y = -2x + 4$

**d**  $y = -2x + 8$

**14** Identical bottles are packed in a box. The box will hold a maximum of 38 bottles. The relationship between  $M$ , the total mass of the box and its contents, and  $n$ , the number of bottles in the box, is represented by the equation  $M = 500n + 800$ .

Which of the following are possible integer values for the variable  $n$ ?

**a**  $n$  is greater than 37.

**b**  $n$  is greater than or equal to 0.

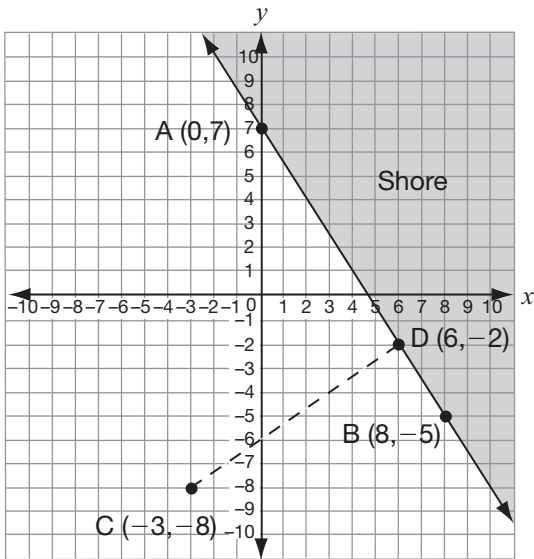
**c**  $n$  is greater than 0 but less than 39.

**d**  $n$  is greater than or equal to 0 but less than 39.



**15 Washed Up on the Shore**

A boat is travelling from Point C toward Point D, which is on the shoreline. The shoreline is represented by the line through points A and B.



Determine whether the path from C to D is perpendicular to the shoreline. Justify your answer.

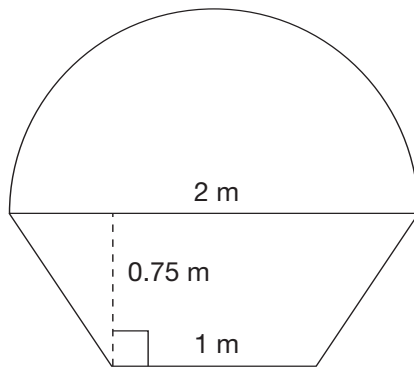


- 16** Maria grows several varieties of plants in a rectangular-shaped garden. She uses fencing to divide the garden into 16 squares that are each 1 m by 1 m. She also puts fencing around the perimeter of the garden.

Which of the following represents the smallest amount of fencing that Maria needs?

- a 24 m
- b 40 m
- c 42 m
- d 49 m

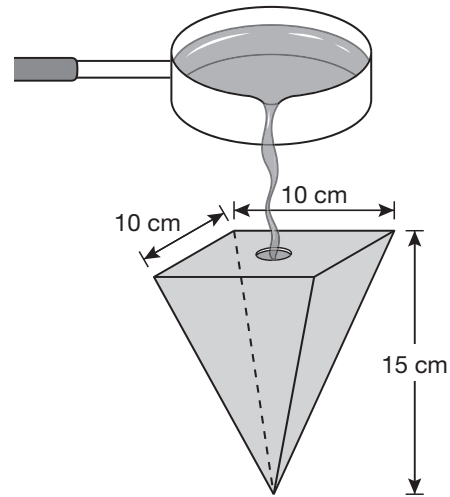
- 17** The Cutie Cupcake Company is having a sign made. The sign will be a semicircle on top of a trapezoid.



Which of the following is closest to the total area of the sign?

- a  $4.27 \text{ m}^2$
- b  $2.70 \text{ m}^2$
- c  $1.57 \text{ m}^2$
- d  $1.13 \text{ m}^2$

- 18** The mould shown below is used to make a candle in the shape of a square-based pyramid.



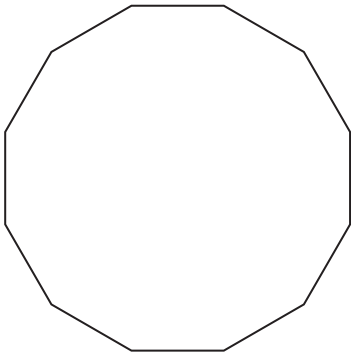
What is the volume of the mould?

- a  $1500 \text{ cm}^3$
- b  $500 \text{ cm}^3$
- c  $400 \text{ cm}^3$
- d  $35 \text{ cm}^3$

- 19** If the radius of a sphere is tripled, the surface area of the sphere will increase

- a by a factor of 3.
- b by a factor of 4.
- c by a factor of 6.
- d by a factor of 9.

- 20** What is the measure, in degrees, of the sum of the interior angles of a 12-sided regular polygon?

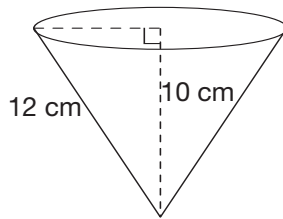


- a**  $2160^\circ$
- b**  $1800^\circ$
- c**  $1500^\circ$
- d**  $1080^\circ$



**21 Cone Zone**

Zach measures the slant height of a cone-shaped cup and finds that it is 12 cm. The height is 10 cm.



Determine the volume of water in the cup if Zach fills it to the top.

Show your work.

# Sample Assessment Questions: Academic

## Student Answer Sheet

Enter your multiple-choice answers on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown below:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ○

- If you fill in more than one answer to a question, the question will be scored incorrect.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)
2. (a) (b) (c) (d)
3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. Respond in booklet.

6. (a) (b) (c) (d)
7. (a) (b) (c) (d)
8. (a) (b) (c) (d)
9. Respond in booklet.

10. (a) (b) (c) (d)
11. (a) (b) (c) (d)
12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. Respond in booklet.

16. (a) (b) (c) (d)
17. (a) (b) (c) (d)
18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



# Academic

## Grade 9 Assessment of Mathematics

Spring 2008

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Spring 2008, Academic).**

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Please note: The format of these booklets is slightly different from that used for the assessment. The items themselves remain the same.

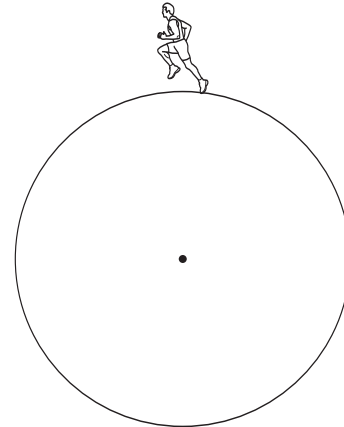
- 1** The expression below can be simplified.

$$\frac{(x^2y)^3}{(xy)^2}$$

Which of the following shows the expression in its simplest form?

- a  $x^4y$
  - b  $x^4$
  - c  $xy$
  - d  $x^3y$
- 2** Josie works in a sports store. She receives 8% of the total sales each day. One day, she receives \$35 for her portion of the total sales. What are the total sales for that day?
- a \$37.80
  - b \$43.75
  - c \$280.00
  - d \$437.50
- 3** Which of the following represents the expression  $2(3x + 4) + 3(x - 1)$  in a simplified form?
- a  $9x + 3$
  - b  $9x + 5$
  - c  $8x + 8$
  - d  $8x + 11$

- 4** The distance covered in 5 laps of a circular track is  $400\pi$  metres.

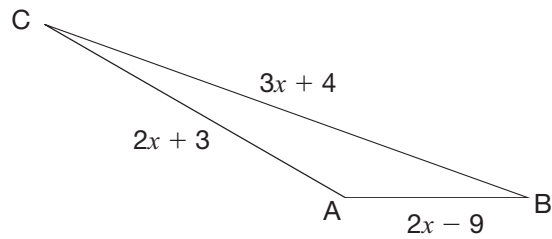


What is the shortest distance between any point on the track and the centre?

- a 400 m
- b 200 m
- c 80 m
- d 40 m

**5 What Side?**

The perimeter of the triangle below is 75 m.

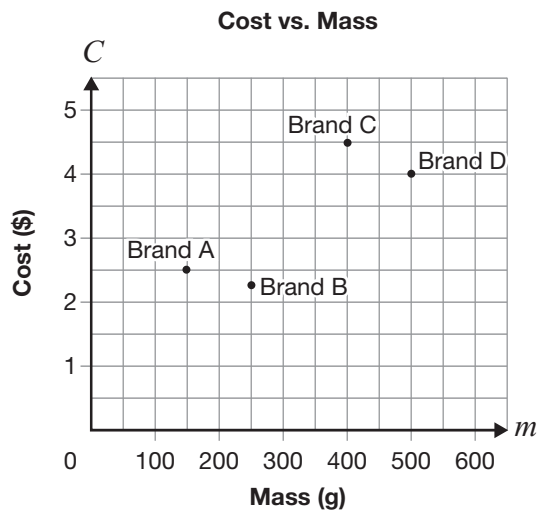


Determine the measure of each side of the triangle.

Show your work.



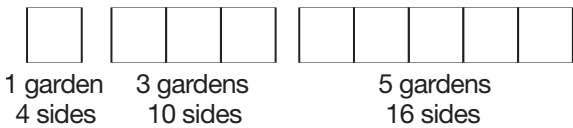
- 6** The following graph shows the relationship between the mass and the cost of four different brands of strawberry jam.



Which statement is true?

- a Brand A has the lowest cost.
- b Brand B has the smallest mass.
- c Brand C has the highest cost per gram.
- d Brand D has the lowest cost per gram.

- 7** Square gardens are arranged side by side as shown below.



Which table of values represents the relationship between the number of gardens and the number of sides?

a

Number of gardens	Number of sides
1	4
2	8
3	12
4	16
5	20

b

Number of gardens	Number of sides
1	4
2	5
3	10
4	11
5	16

c

Number of gardens	Number of sides
1	4
2	6
3	10
4	14
5	16

d

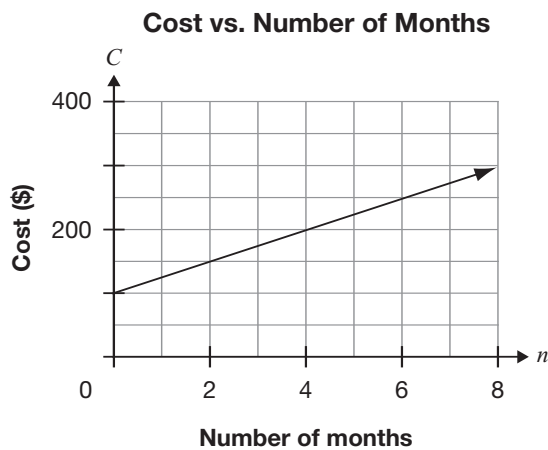
Number of gardens	Number of sides
1	4
2	7
3	10
4	13
5	16

- 8** Gerry has a table of values representing a linear relation. Two of the numbers are hidden behind a ketchup spill.

$x$	$y$
-2	-6
-1	
0	
1	18

The values that are hidden are

- a -2 and 14.
  - b 0 and 12.
  - c 2 and 10.
  - d 3 and 9.
- 9** The graph below represents the cost to belong to a local gym.



Which equation represents the graph?

- a  $C = \frac{1}{25}n + 100$
- b  $C = \frac{1}{2}n + 100$
- c  $C = 2n + 100$
- d  $C = 25n + 100$



**10 Wing Length**

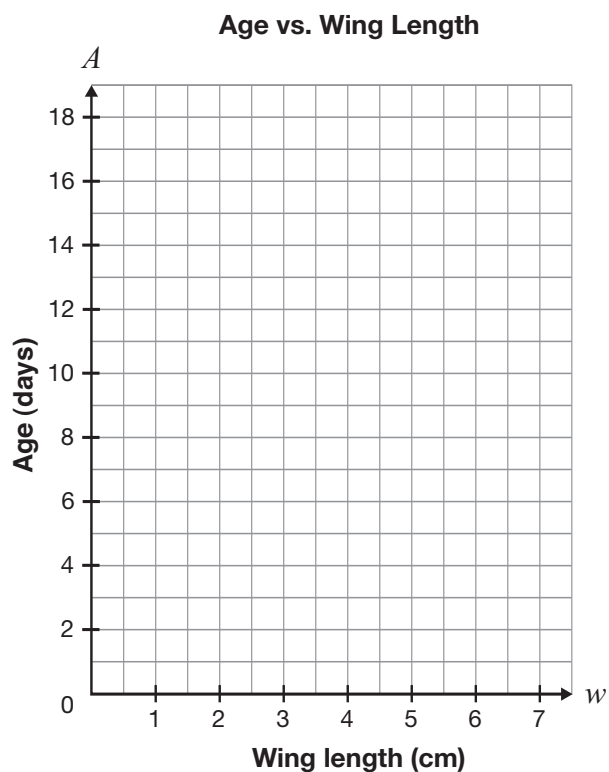
Wing length is a reliable method for determining the age of young birds. Below is an example of data for a particular species.

Wing length (cm)	Age (days)
1.5	4
3.1	8
3.2	10
4.1	12
5.2	16

Determine the age of a bird with a wing length of 3.6 cm.

You may use the grid if you wish.

Justify your answer.



- 11** The table below shows examples of linear and non-linear equations.

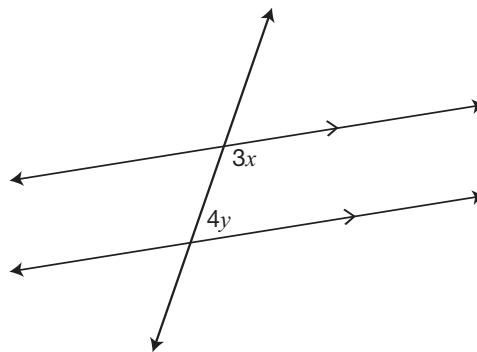
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Which of these statements best describes how linear equations are different from non-linear equations in the table above?

- a The exponent of both variables in the linear equations is 1.
- b The exponent of exactly one variable in the linear equations is 1.
- c The exponent of both variables in the non-linear equations is 1.
- d The exponent of exactly one variable in the non-linear equations is 1.

- 12** The relation shown below can be expressed as  $3x + 4y - 180 = 0$ .



Another way to write this relation is

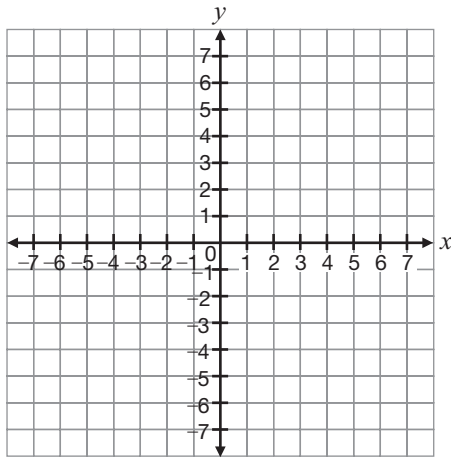
- a  $y = \frac{3}{4}x - 45$ .
- b  $y = -\frac{3}{4}x + 45$ .
- c  $y = -\frac{4}{3}x + 60$ .
- d  $y = \frac{4}{3}x - 60$ .

- 13** How would the graph of the relation  $y = 3x - 2$  change if the 3 and  $-2$  were both doubled?

The graph would be

- a steeper and have a lower  $y$ -intercept.
- b steeper and have a higher  $y$ -intercept.
- c less steep and have a lower  $y$ -intercept.
- d less steep and have a higher  $y$ -intercept.

- 14** Consider the points A(1, 4), B(6, 3), C(−1, 5), D(−3, 0) and E(2, −1).



Which line segment is parallel to AB?

- a AE
  - b BE
  - c CE
  - d DE
- 15** Identical bottles are packed in a box. The box will hold a maximum of 38 bottles. The relationship between  $M$ , the total mass of the box and its contents, and  $n$ , the number of bottles in the box, is represented by the equation  $M = 500n + 800$ .

Which of the following are possible integer values for the variable  $n$ ?

- a  $n$  is greater than 37.
- b  $n$  is greater than or equal to 0.
- c  $n$  is greater than 0 but less than 39.
- d  $n$  is greater than or equal to 0 but less than 39.





**16 Excellent Equations**

A line is perpendicular to the line  $y = 2x + 3$  and has the same **x-intercept** as  $x + 3y + 10 = 0$ .

Find the equation of this line. Express your answer in the form  $y = mx + b$ .

Justify your answer.

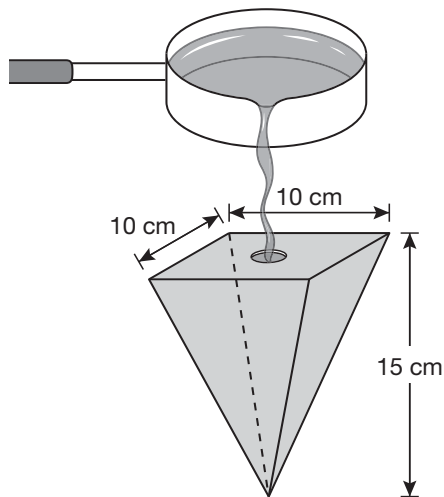


- 17** Maria grows several varieties of plants in a rectangular-shaped garden. She uses fencing to divide the garden into 16 squares that are each 1 m by 1 m. She also puts fencing around the perimeter of the garden.

Which of the following represents the smallest amount of fencing that Maria needs?

- a 24 m
- b 40 m
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- d 49 m

- 18** The mould shown below is used to make a candle in the shape of a square-based pyramid.



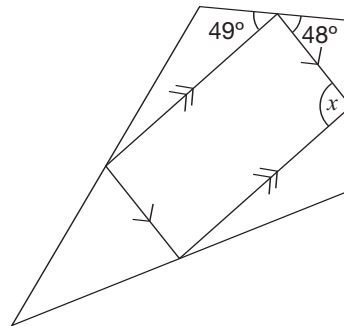
What is the volume of the mould?

- a  $1500 \text{ cm}^3$
- b  $500 \text{ cm}^3$
- c  $400 \text{ cm}^3$
- d  $35 \text{ cm}^3$

- 19** If the radius of a sphere is tripled, the surface area of the sphere will increase

- a by a factor of 3.
- b by a factor of 4.
- c by a factor of 6.
- d by a factor of 9.

- 20** A parallelogram is inscribed in a quadrilateral as shown.

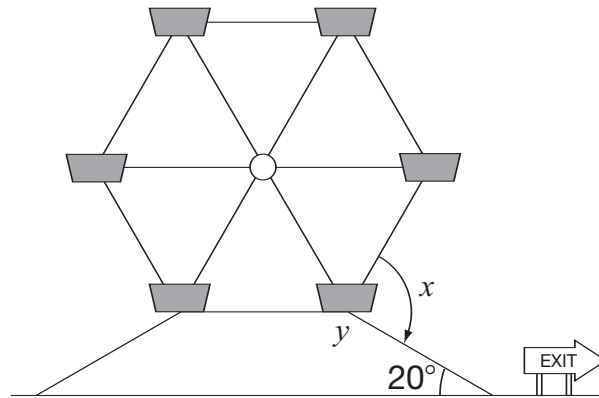


What is the value of  $x$ ?

- a  $48^\circ$
- b  $49^\circ$
- c  $83^\circ$
- d  $97^\circ$

**21 Wheels of Fun**

A Ferris wheel has six sides of equal length. The exit ramp of the Ferris wheel is in the shape of a trapezoid and has an angle of incline of  $20^\circ$ .



What are the values of  $x$  and  $y$ ?

Use geometric properties to justify your answer.

## Sample Assessment Questions: Academic

## Student Answer Sheet

Enter your multiple-choice answers on this sheet.

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End of Assessment

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



